

Nash Motorsports  
BMW E36 LS1 Conversion  
Part 1  
Rev 18Oct05

# ***Prepare the Car***

Follow these instructions step by step and by the end your car will be ready for marriage to your LS1 powertrain.

While it is possible to complete this prep work in a weekend it is more realistic to plan on 4-5 good days to get everything ready.

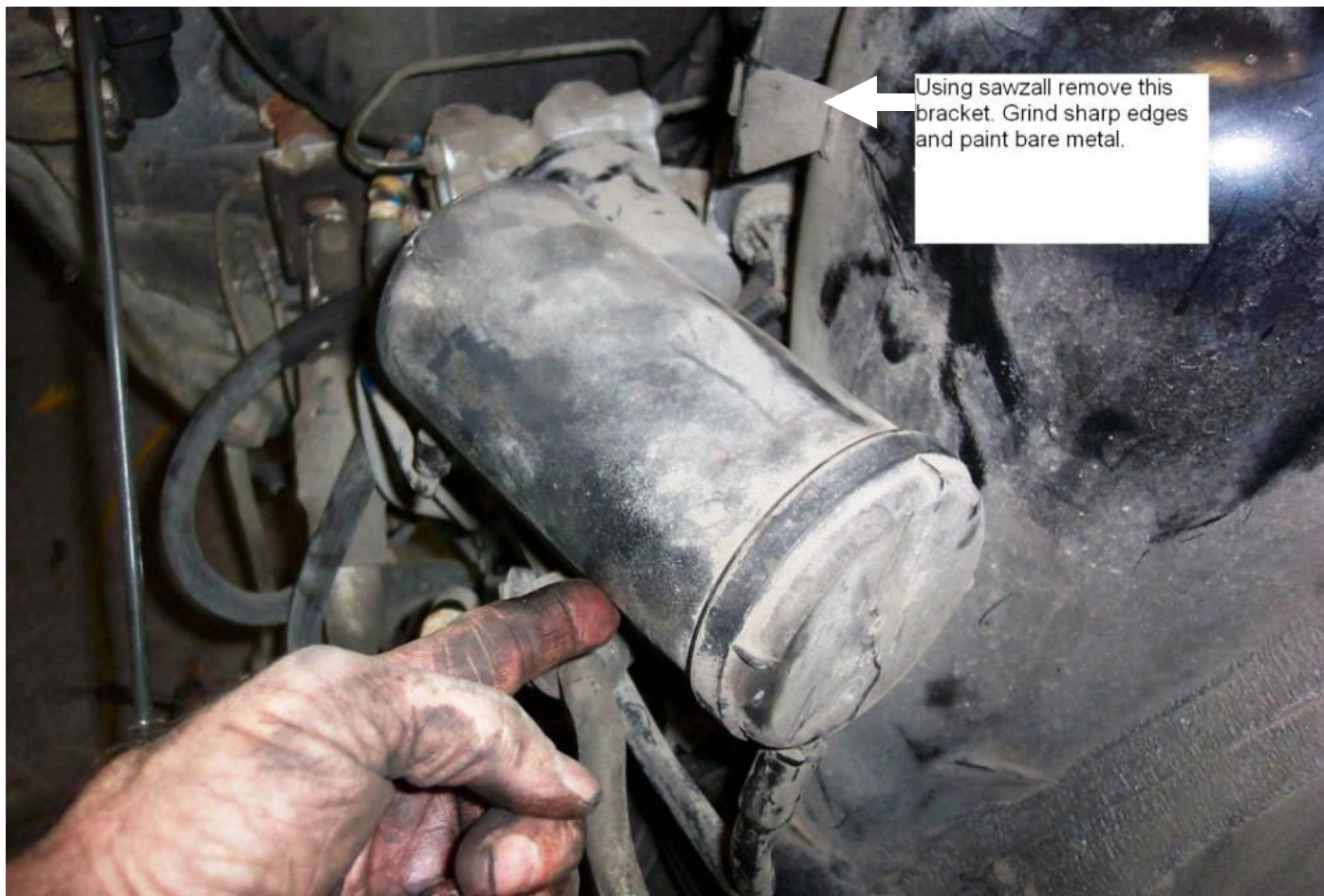
It is best to print out these instructions in black and white. Color is nice but it takes a long time and you will burn up a lot of ink.

If there are any questions, please call. I am here to help and want your swap to be a fantastic experience!

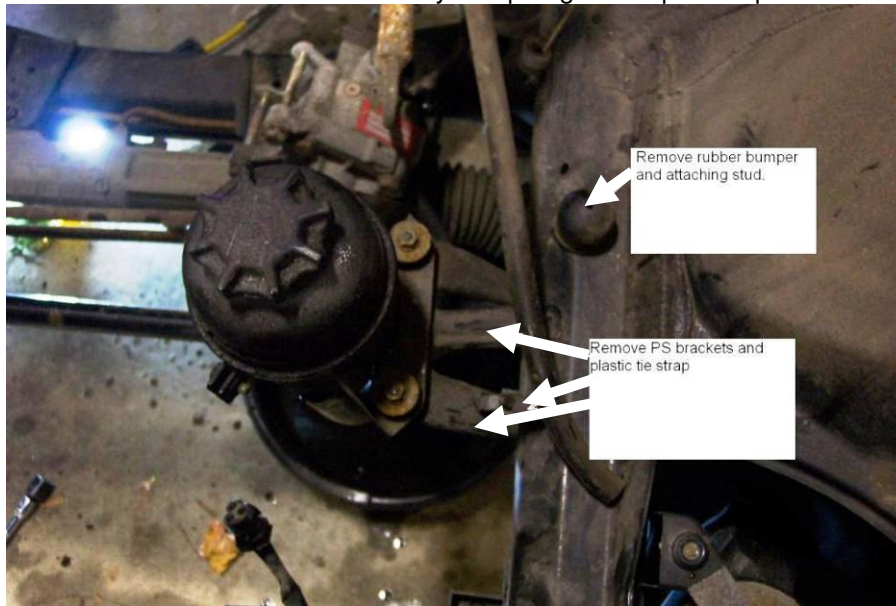
Sincerely,

Mike Collins  
586-943-6385

- 1 Follow service manual instructions to remove motor and transmission.
- 2 Remove evap canister.
- 3 Using sawzall remove bracket shown in picture. Grind sharp edges and paint bare metal.

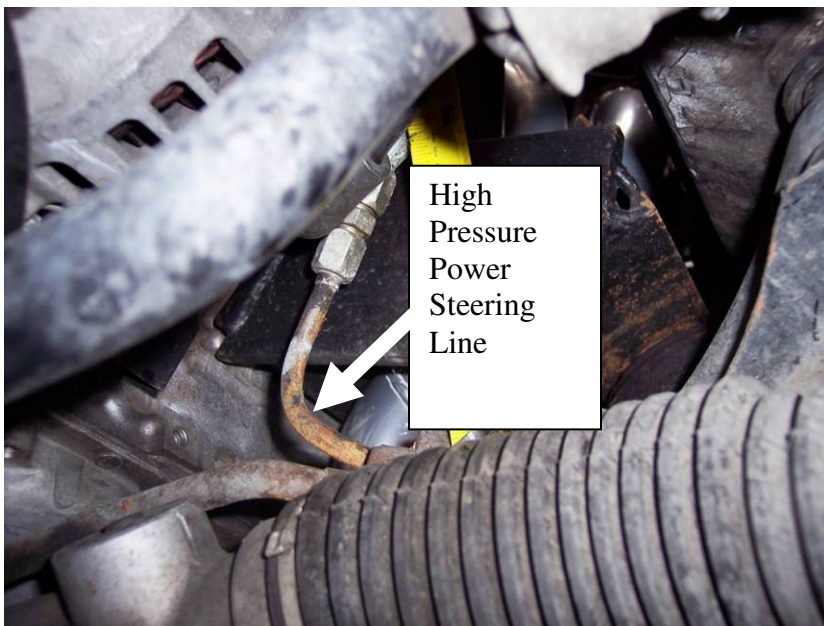


- 4 Cut rubber PS reservoir return hose and supply hose close to the reservoir.
- 5 Disconnect high pressure line from PS pump.
- 6 Remove PS pump and reservoir.
- 7 Note: some models use brackets welded to the body to mount the PS reservoir. If you have these brackets remove them by cutting with a sawzall. Grind away sharp edges and paint exposed metal surfaces.



**PS Bracket Removed 1**

- 10 Remove high pressure line from PS rack (Line from pump)
- 11 Install power steering line adapter into rack.
- 12 Leave return line attached to rack.



[PS Line with tape.jpg](#)



[PS rack with adapter.jpg](#)

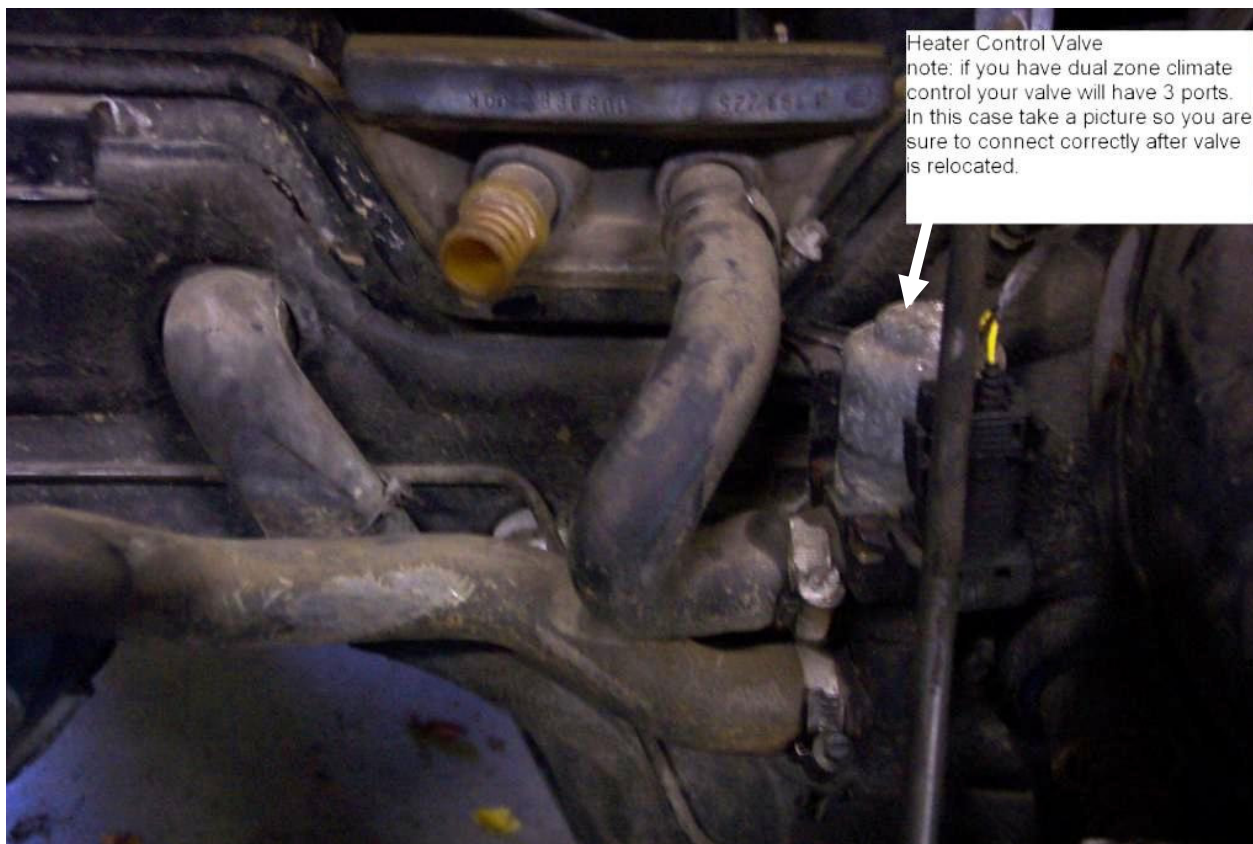


- 13 Remove cruise control unit
- 14 Use sawzall to remove front cruise control bracket (leave rear bracket in place)



Cruise control and bracket.jpg

- 15 Powerwash and clean engine compartment
- 16 Place vehicle in work area on jack stands.
- 17 While not necessary, removal of fenders, AC condenser, and entire front clip makes installation of the motor much easier and is highly recommended. It probably takes about 2 hours to completely remove clip but believe me this is time well spent!
- 18 Locate heater control valve (next to brake booster) and document how the lines are attached.
- 19 Disconnect coolant lines and electrical wires and remove heater control valve. Control valve will be relocated to passenger side of radiator.



Heater control valve.jpg

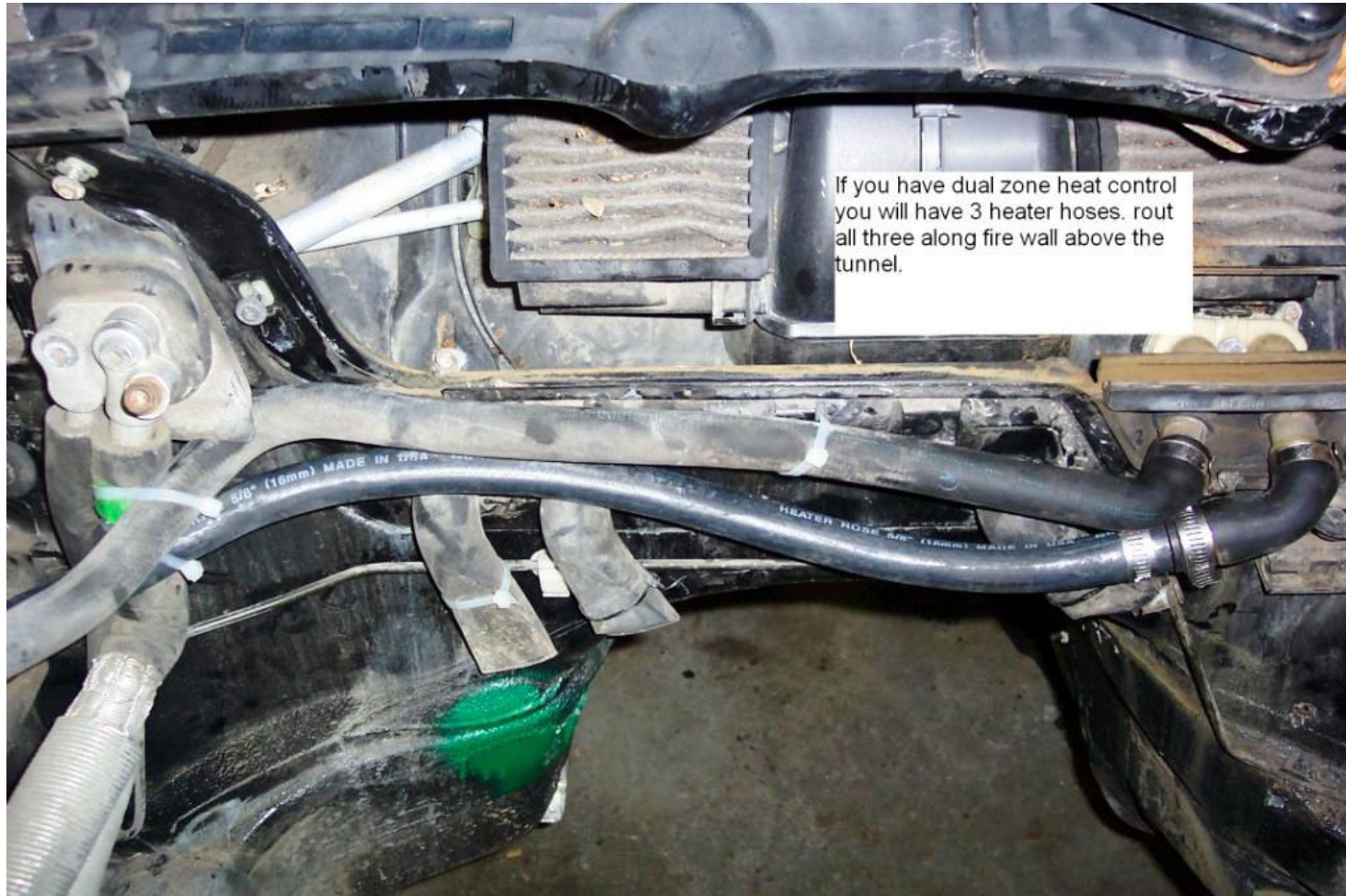


20

Remove insulation from firewall and tunnel.

21

Using a combination of the existing BMW heater hose and new hose rout heater hoses along top of tunnel and attach to AC line with tie strap. Leave hoses long enough to reach the passenger side of the radiator as this is where the heater control valve will be relocated.



Heater hose routing.jpg

22 Using hammer, modify tunnel to give clearance for the transmission.



Hammer tunnel.jpg



Tunnel finished.jpg



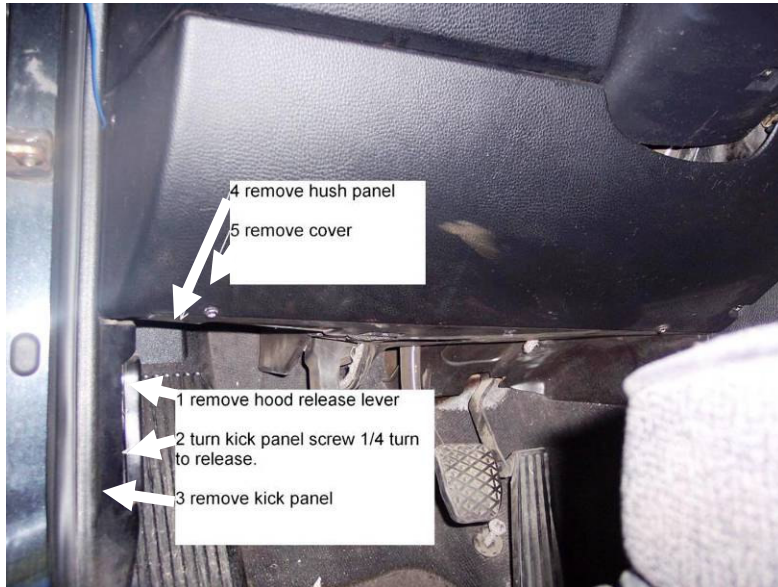
23

Use sawzall to remove shifter mounting bracket. (located in tunnel behind shifter hole)



Shifter bracket.jpg

- 24 Inside engine compartment remove brake lines from master cylinder, disconnect clutch fluid line from brake reservoir.
- 24.1 If you have a 92 – 94 car then unplug sensor from booster and install 380 ohm resistor.
- 25 Inside car, remove driver side kick panel, hush panel, knee bolster cover, and knee bolster so you can get to the brake pedal brackets.

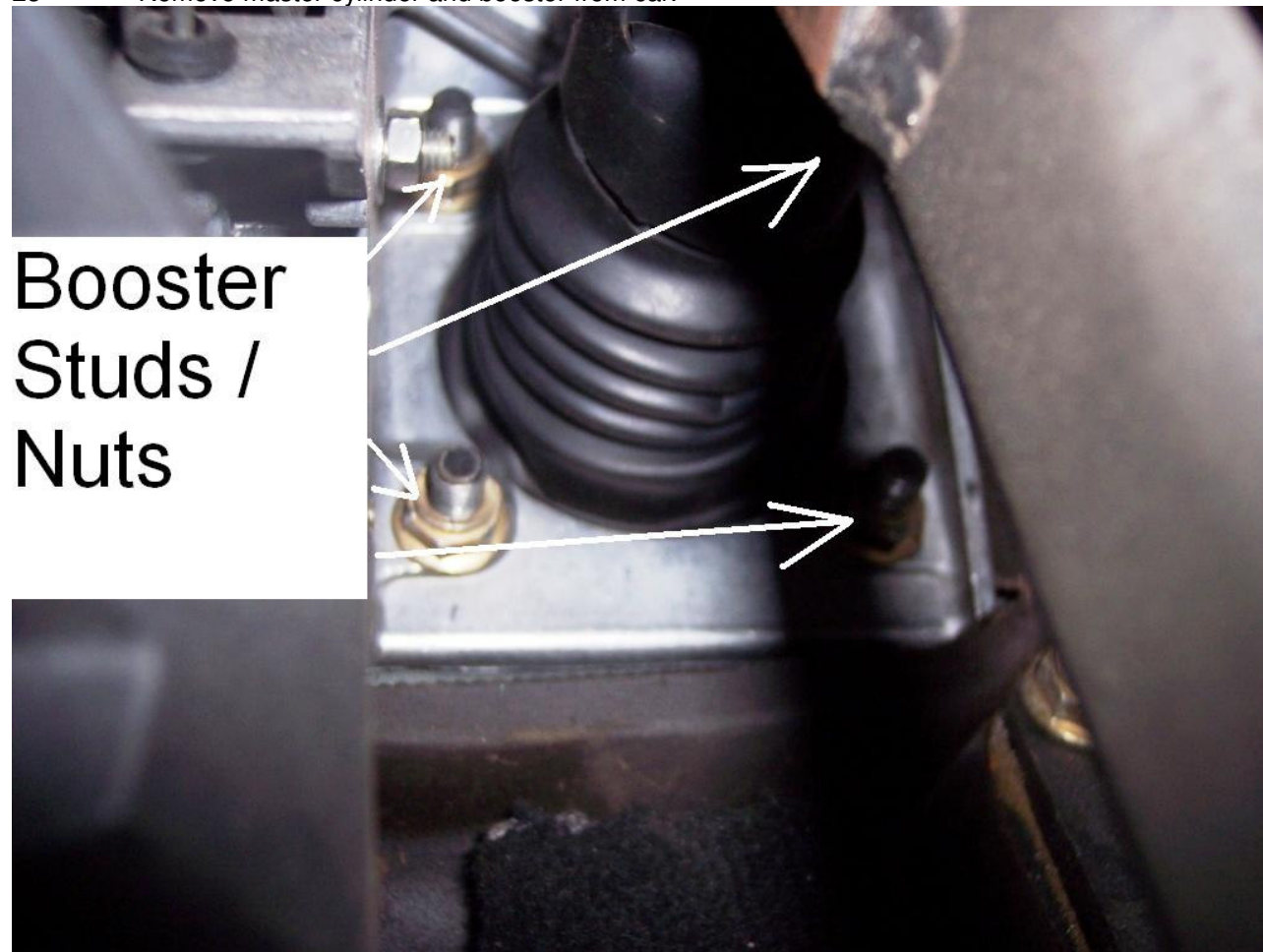


Panels.jpg



Knee bolster.jpg

- 26 Remove 4 nuts from brake booster studs.
- 27 Remove brake booster push rod from brake pedal.
- 28 Remove master cylinder and booster from car.



[Booster Studs.JPG](#)



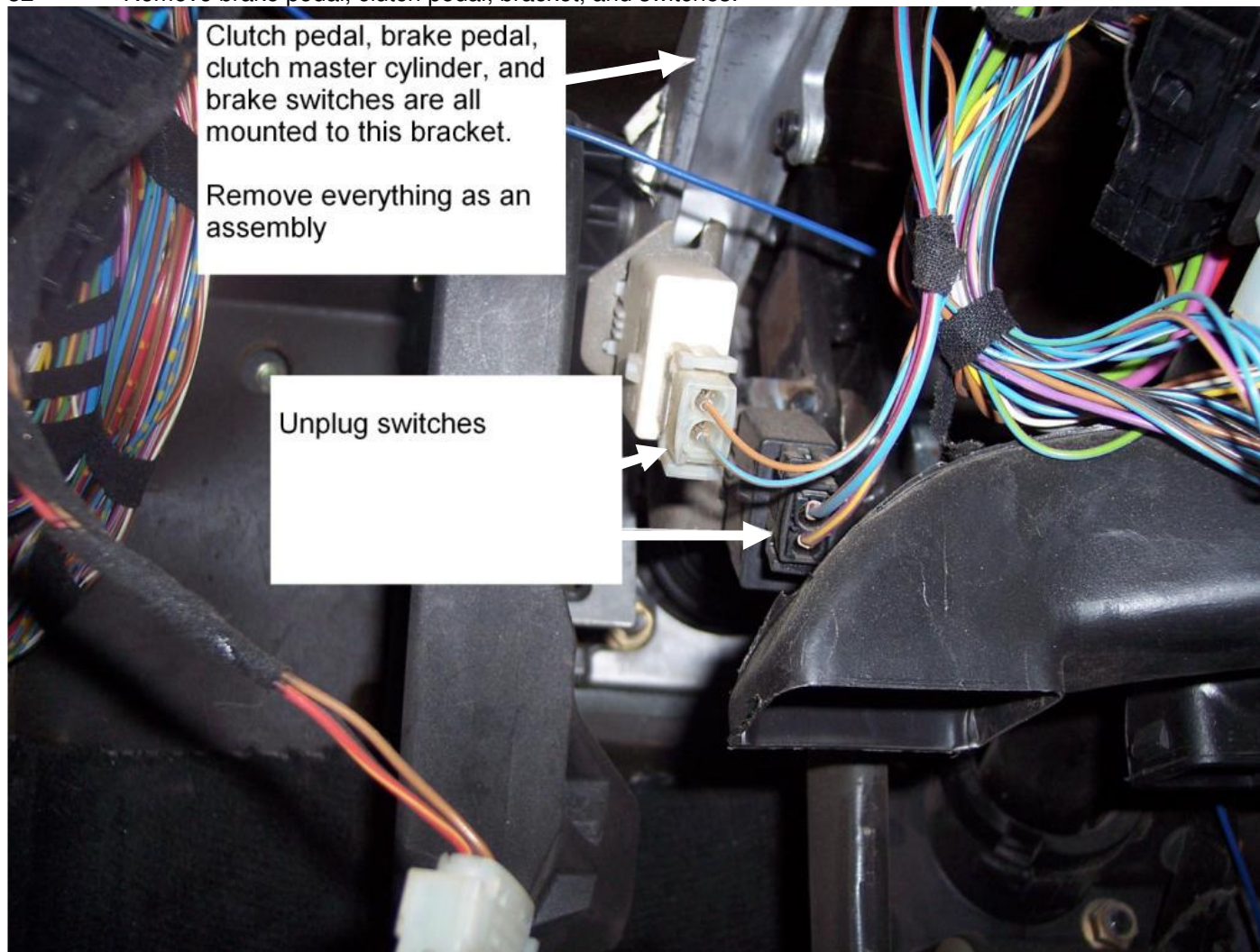
- 29 Remove retaining clip from clutch master cylinder and remove clutch line from clutch master cylinder.  
30 Reinsert clip into clutch master.



Clutch Line.jpg



- 31 From inside of car unplug electrical connectors at the two switches on the pedal bracket  
32 Remove brake pedal, clutch pedal, bracket, and switches.



Brake switches.jpg

- 33 Send brake pedal, pedal bracket, and switches to the following address to be reworked to accept the hydroboost pushrod.

**Nash Motorsports**  
**7315 Greeley St**  
**Utica, MI 49317**

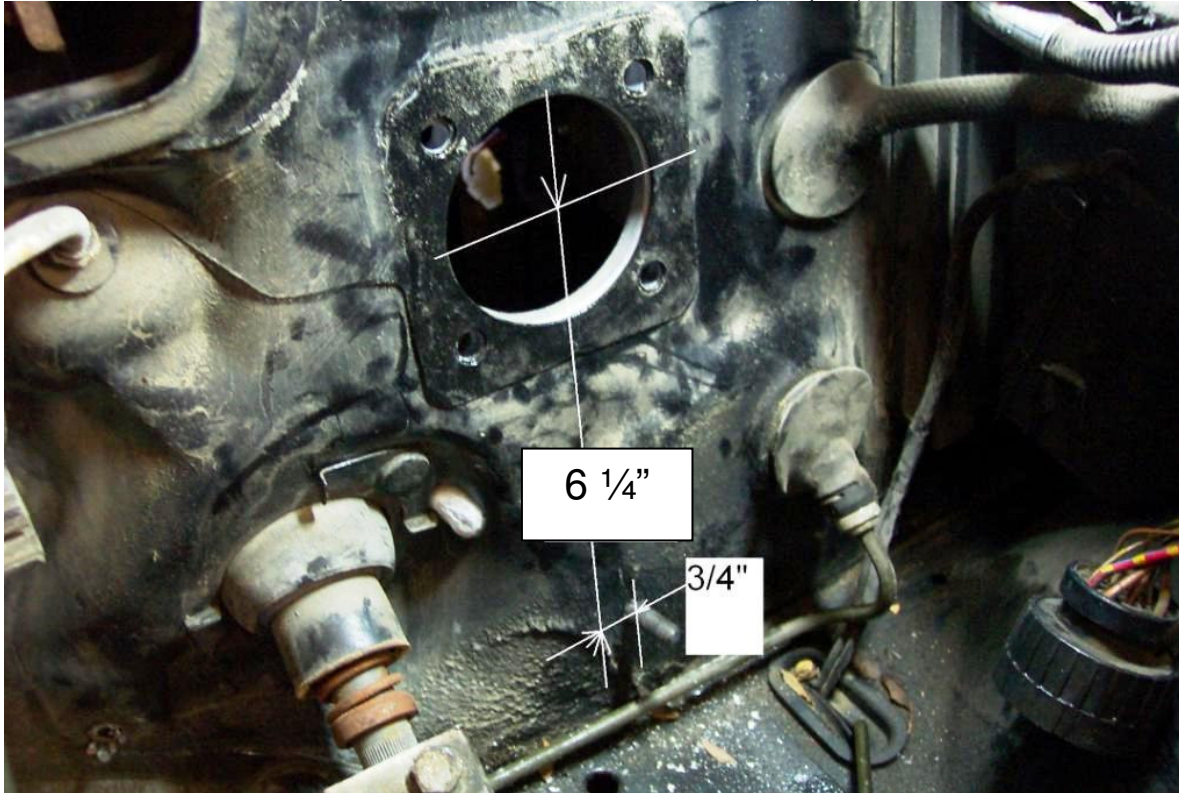
- 34 Remove front and rear brake lines from ABS modulator (leave master cylinder lines attached). Remove ABS modulator and clean area behind modulator.
- 35 Cut ABS brackets using sawzall.
- 36 Paint exposed metal.



Cutting ABS bracket.jpg



- 37 From center of brake booster hole measure straight down 6 1/4" and outboard 3/4". Drill 3/8" hole through firewall at this location.  
38 From inside car install M8 x 25 bolt through hole just drilled.  
39 Install 2 washers provided over bolt to act as shims. (see pics)



ABS bolt through firewall.jpg



ABS bolt with shims.jpg

- 40 Cut the legs off of the rear ABS bracket and drill out existing hole to 3/8"  
41 Attach rear ABS bracket to firewall.



[ABS bracket installed.JPG](#)



- 42 Attach new ABS bracket to ABS modulator. Place ABS into rear bracket and allow front bracket to rest on frame rail. Be sure rubber isolators are fully seated in rear ABS bracket.
- 43 Using new ABS bracket as template, drill 1/4" hole in wheel house and attach bracket using m8 bolt and nut provided.



[Drilling hole in fender for ABS bracket.JPG](#)

- 44      Rebend brake lines and reattach to ABS modulator. Be sure rear line has adequate clearance to the steering shaft. Use a 13mm box end wrench as a bending tool to work the rear line.

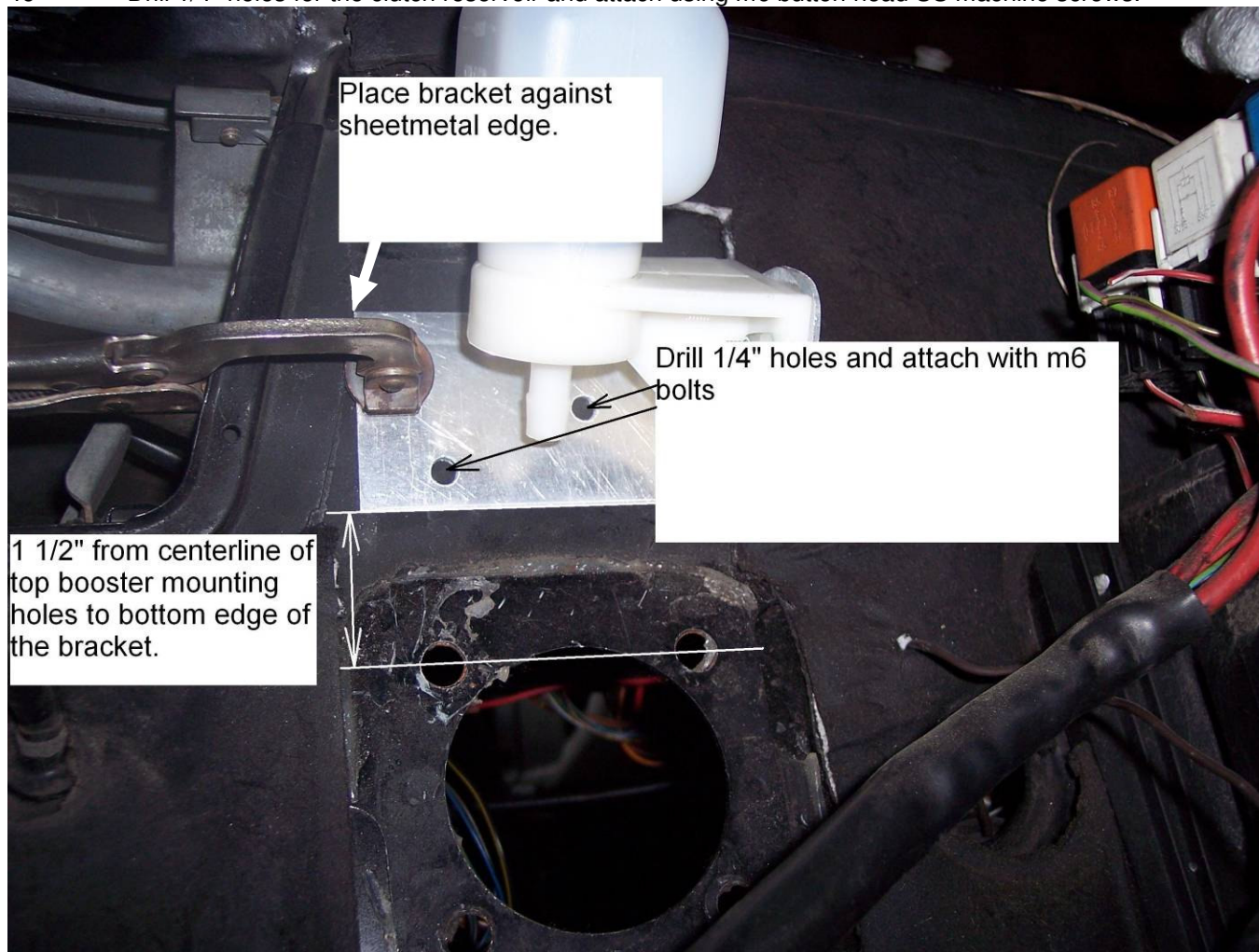


[ABS installed.JPG](#)



[Brake lines reattached 2.JPG](#)

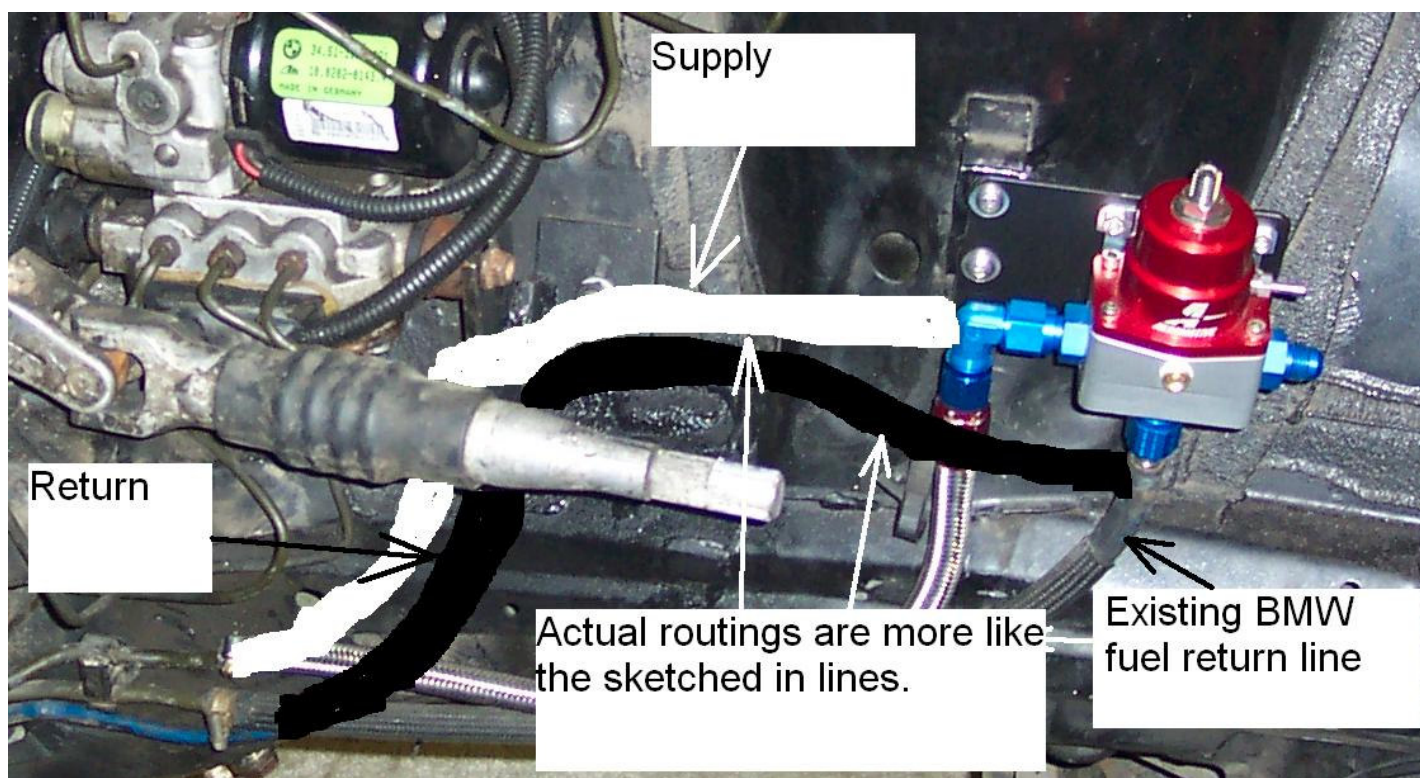
- 45 Place clutch fluid reservoir on firewall and mark mounting hole locations. (see pic)  
46 Drill 1/4" holes for the clutch reservoir and attach using m6 button head SS machine screws.



[Clutch Reservoir Location.JPG](#)



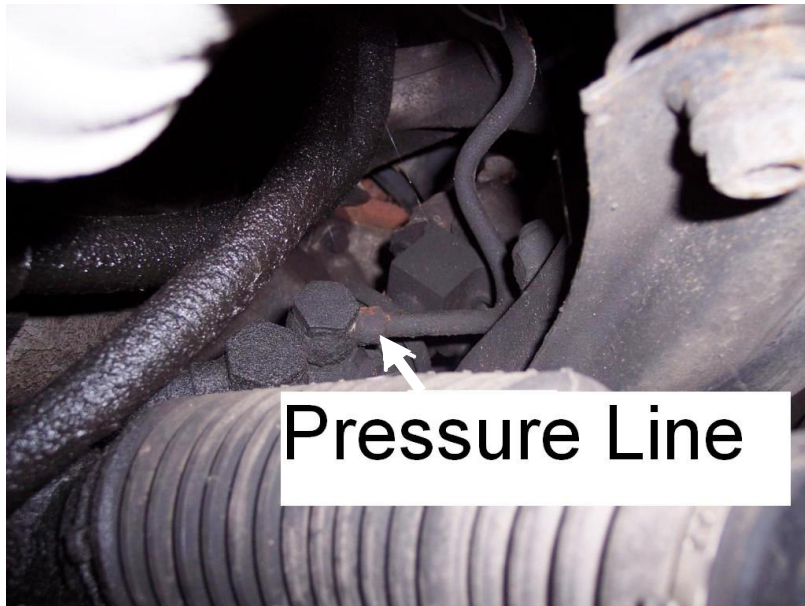
- 47 Attach Fuel Pressure Regulator to the bracket on the shock tower using m6 button head SS machine screws. The attached picture shows an early fuel line routing. Pictures of the actual routings were lost in a hard drive crash - sorry.
- 48 Run the fuel pressure line (SS braided line) rearward and tie strap to the ABS bracket pulling the fuel line as close to the fender as possible then down next to the frame rail and back to the pressure line on the BMW (the pressure line is the one with the fuel filter). Do not connect yet.
- 49 If you have not replaced your fuel filter recently do it now! This motor requires lots of fuel during and a dirty filter will starve the motor.
- 50 Run the fuel return line from the BMW forward to the fuel pressure regulator. Run this line next to and below the fuel pressure line. Tie strap the lines together and keep as close to the fender and rail as possible. Do not connect at this time. We want to be sure there is good clearance to the headers before cutting the line to its final length.



[Fuel Regulator and Lines.JPG](#)



50.1 Remove power steering pressure line and install m14 to -6 metric adapter.



PS Pressure line at rack.jpg

- 51 Remove steering rack.
- 52 Remove front sway bar, and control arms.
- 53 Remove front cross member.
- 54 Leave struts, knuckles, and brakes installed.
- 55 Remove motor mounts from front crossmember and loose install new M3 mounts.
- 56 Tighten mounts just enough to engage the antirotation tabs.
- 57 From inside of car remove large rubber shifter grommet.
- 58 Use Sawzall or saber saw to enlarge shifter hole 1" rearward. Be careful not to cut into console when cutting out tunnel. Remove console to eliminate this concern.

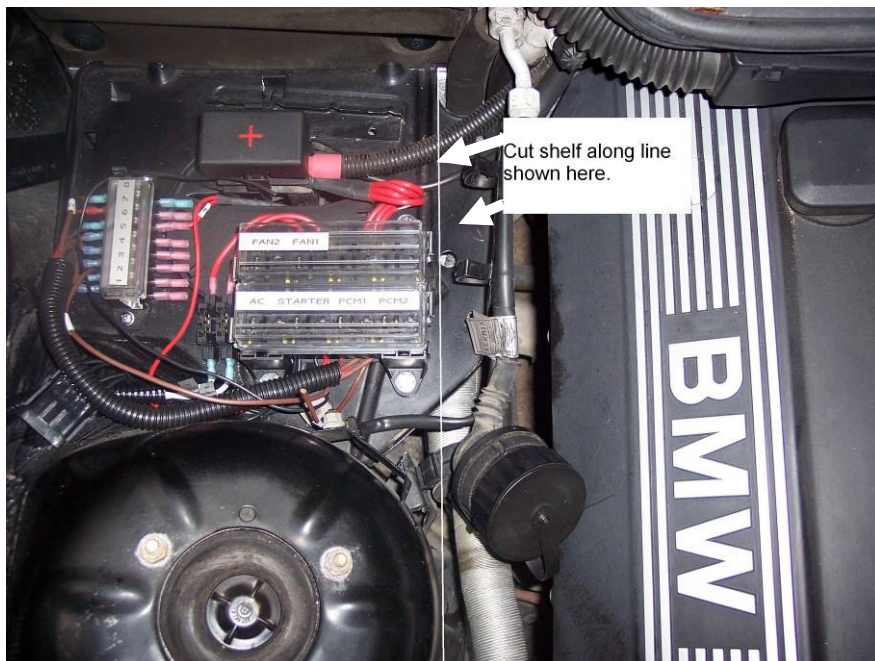


[Trim Carpet.JPG](#)



[Tunnel Cut.JPG](#)

- 59 Inside engine compartment cut battery tray as shown  
60 Remove PCM mounting brackets in the PCM compartment.



[Cut Battery Shelf.JPG](#)



[PCM brackets removed.JPG](#)



61 Cut edge of PCM access hole enough to allow fcar PCM to be installed into PCM mounting compartment.

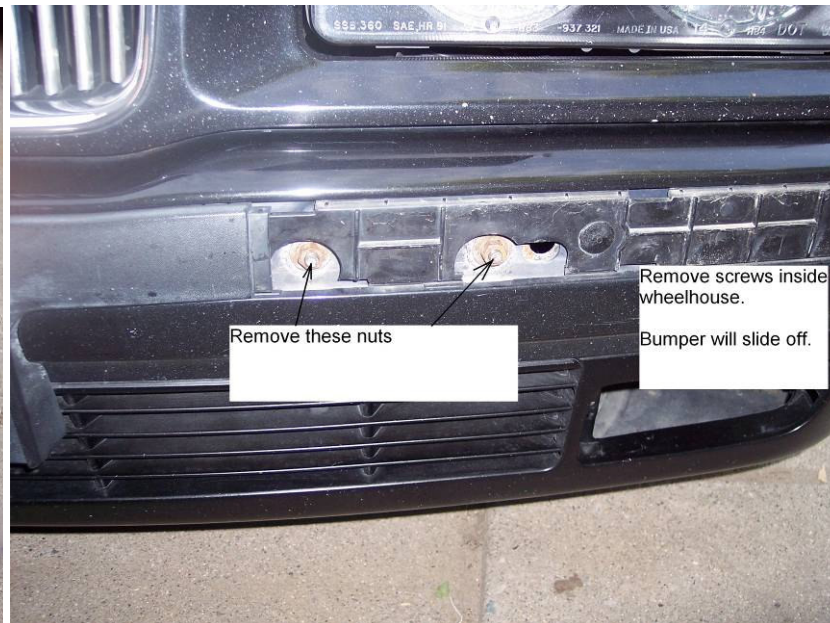


[Cut Edge of PCM Compartment.JPG](#)

62 If not already done, remove front bumper cover.



[Bumper trim.JPG](#) [Bumper Bolts.JPG](#)





63 Remove lower radiator valance and cut using saber saw as shown.



[Lower Radiator Valance.JPG](#)

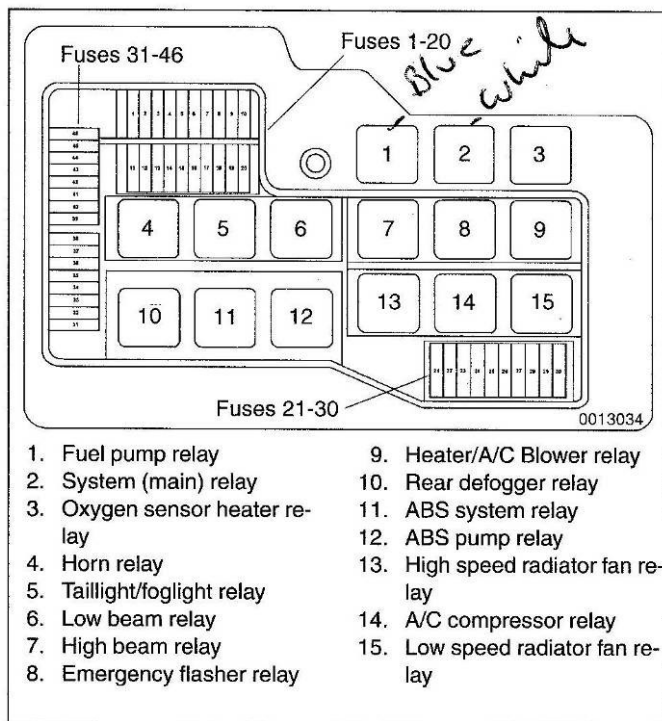


Prepare the BMW electrical harness.

- a. Find the fuel pump relay and locate the brown / green attached to socket 87.  
Cut this wire leaving long enough to attach a crimp on eyelet connector and attach to a ground lug.

## Relay Positions

Mounted in the left-hand rear corner of the engine compartment, the power distribution box contains 46 fuses and 15 relay positions. See Fig. 2.



[Relay Locations.jpg](#)

## BMW Electrical Cont.

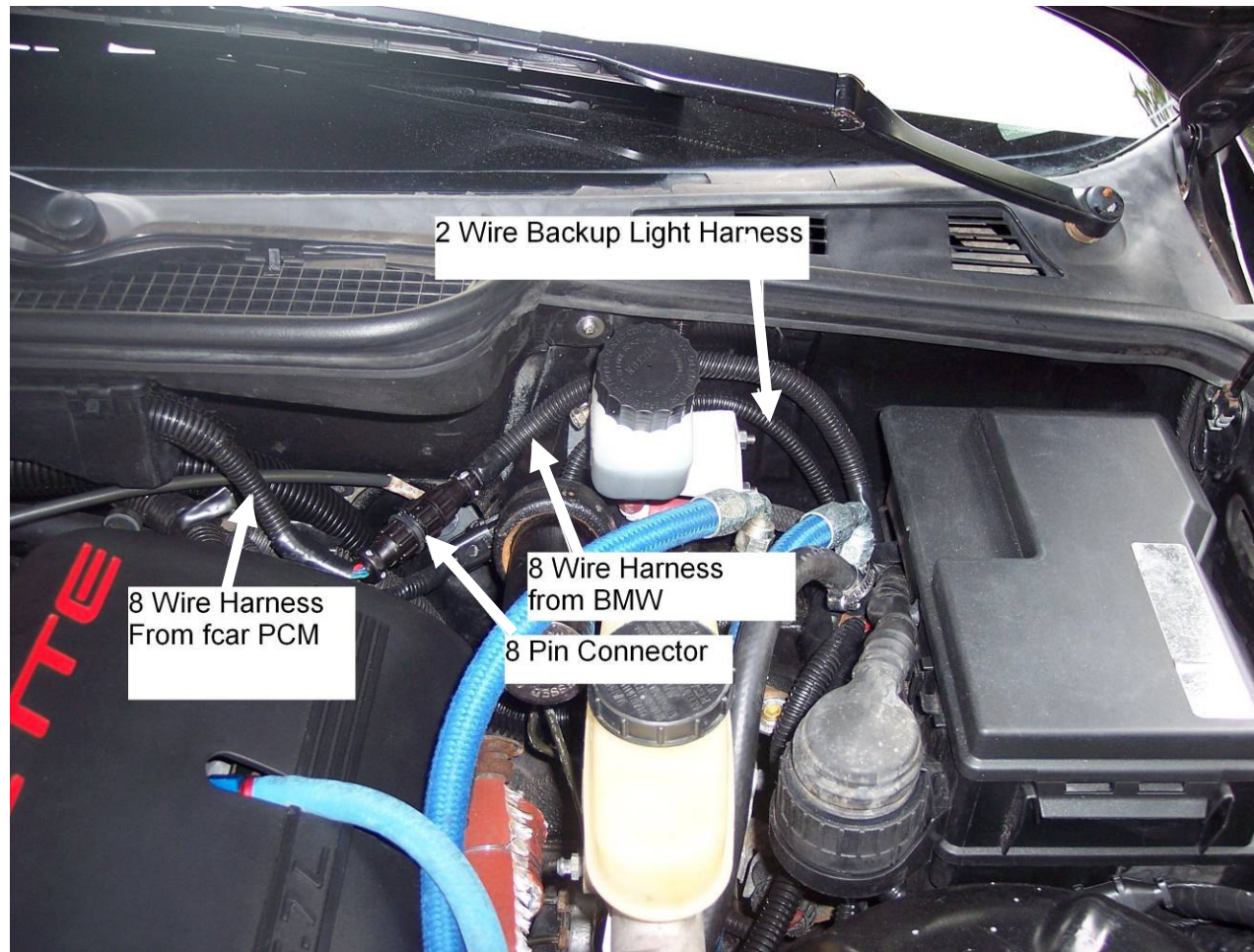
Find the following wires in the BMW wiring harness:

		Connected to Data Link
1	AC Request	No
2	Low Oil Level	No
3	Tachometer	Yes
4	Check Engine	No
5	Generator Status	Yes
6	Oil Pressure	No
7	Temp Gauge Power	No
8	Temp Gauge Ground	No
9	Backup Lights	No
10	Backup lights	Yes
11	Key on power	No
12	Start	Yes

b. Cut wires 1-10 leaving them about 18" long.

Note: For wires connected to the Data Link be sure to cut these after the Data Link splice.

- c. Bundle wires 1-8 together, cut to length, and install the wires into the female 8 pin connector. The pins are soldered onto the wires and then installed into the connector.
- d. Bundle wires 10 and 11 together and attach 2 pin connector using crimp splices.



[Electrical 8 Wire Harness 1.JPG](#)



- e. Locate the large green wire (key on power). Pull this wire from the harness and leave as long as possible. This wire will be used to power the new electrical center.
- f. Locate the large black / yellow wire. Pull this wire from the harness and leave as long as possible. This is the "Start" wire coming from the ignition switch.
- g. Run the green "key on" wire and the black / yellow "start" wire in a conduit with the battery wire that attached to the BMW electrical center. Crimp a blade style connector on the green wire and on the black / yellow wire. It is best to put a male on one and a female on the other. This will prevent the wires from being hooked up wrong.

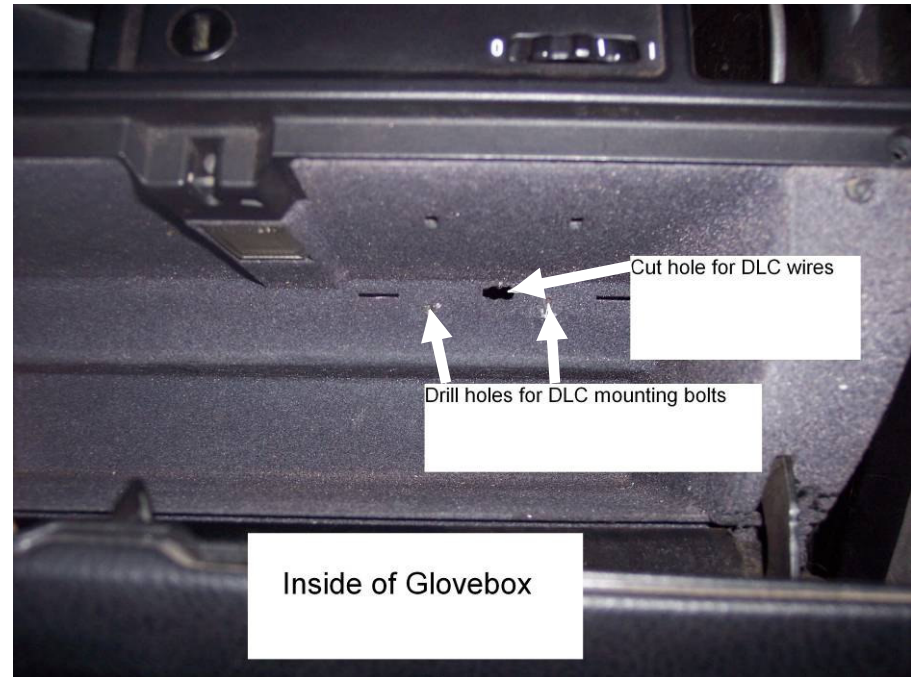


[BMW power conduit.JPG](#)

- 65 Remove data link connector (DLC) from the fcar body wiring harness leaving leads about 12" long.  
67 Remove the glove box inside the car and mount the DLC in the back top of the glove box.



[Data Link Connector.JPG](#)



[DLC mounting location 1.JPG](#)



- 68 Drill a 3/8" hole in the firewall to run the DLC wires through. This hole should be located so the wires will come out below the battery tray. Install rubber grommet in this hole.
- 69 Use excess DLC wire to make jumper wires that go through the rubber grommet in the dash and connect the DLC to the engine harness, power, and ground. Use crimp on connectors on each end of the jumpers to connect to the DLC and engine harness.



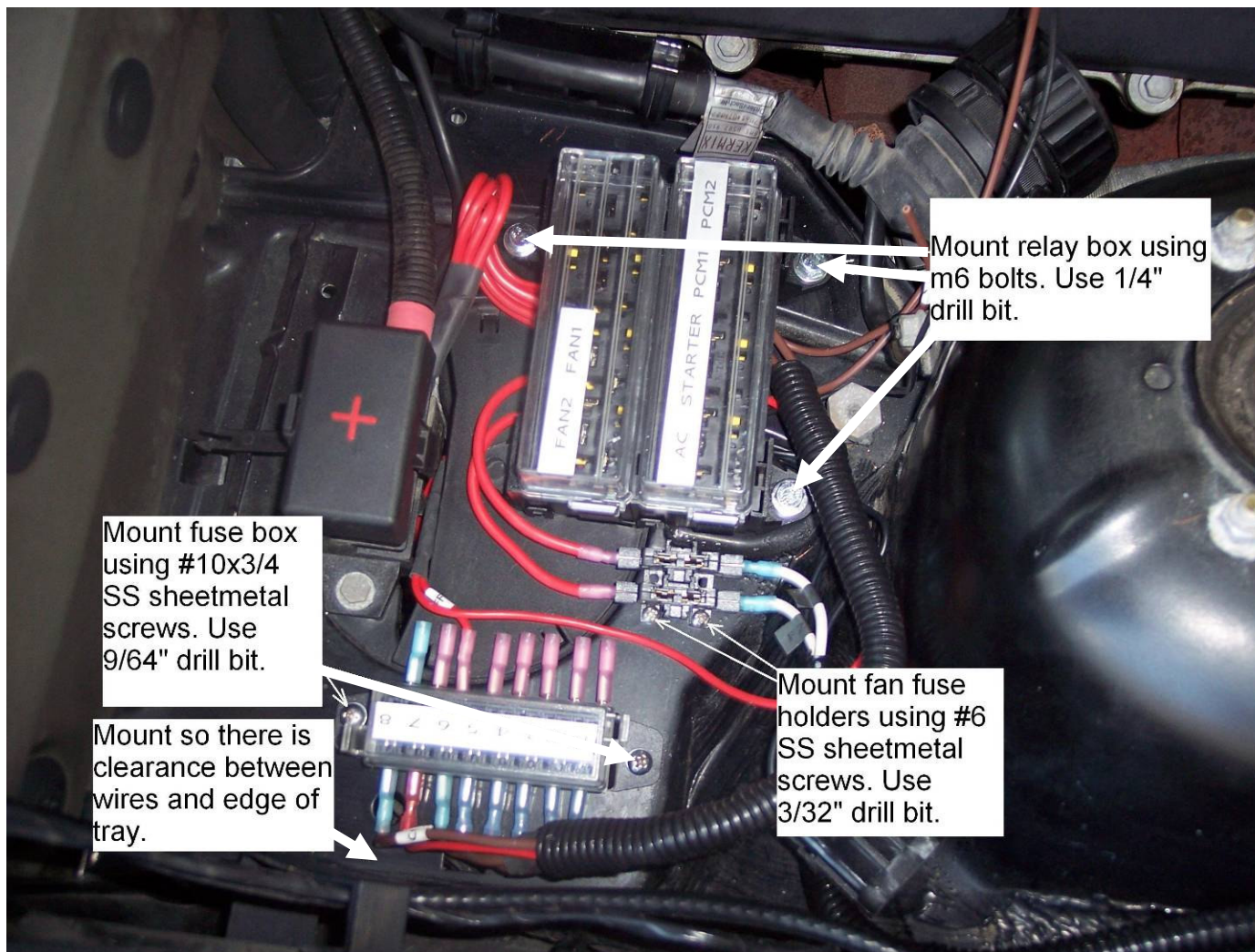
[DLC Grommet.JPG](#)



[Glovebox removed.JPG](#)

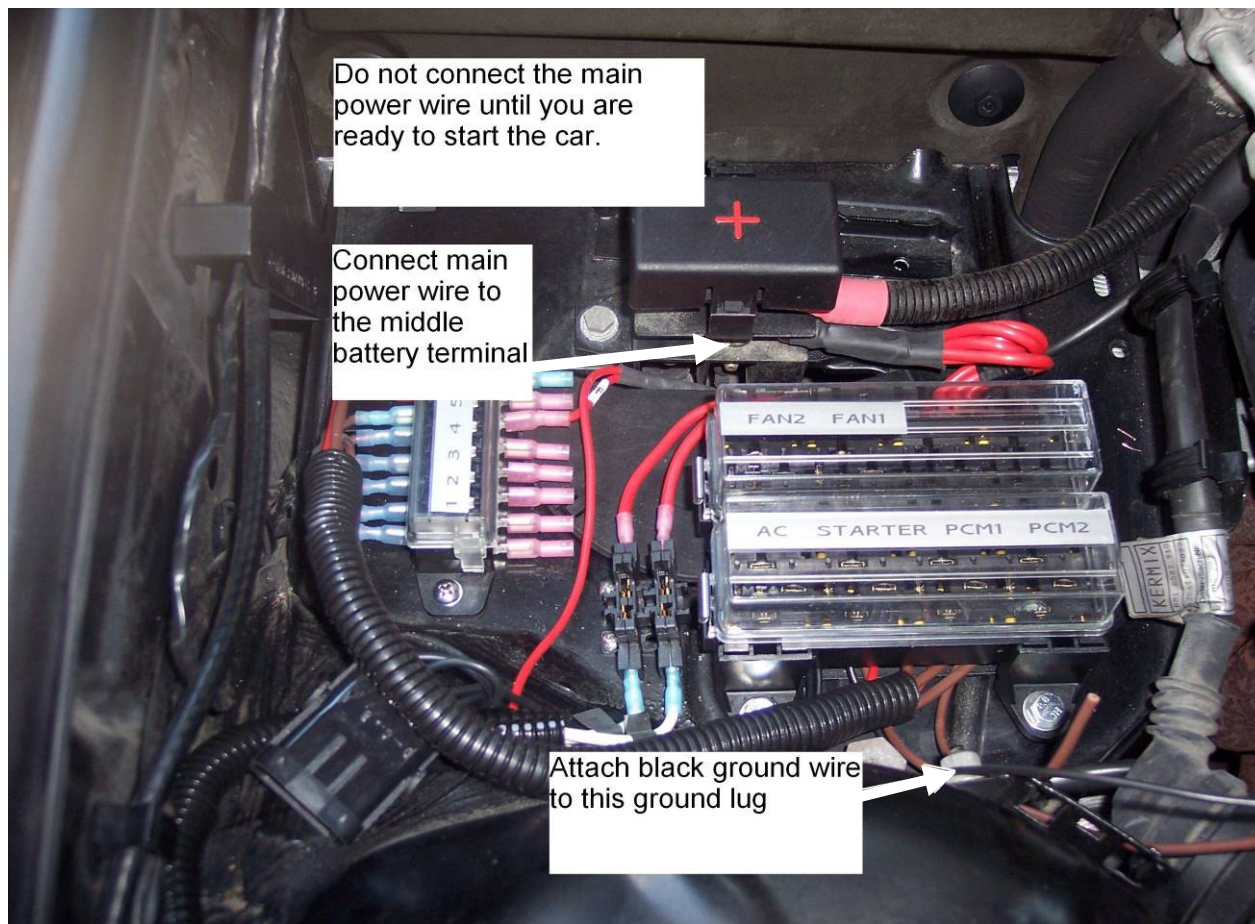


Install new electrical center (EC) onto battery tray as shown in picture.



[Electrical center mounting screws.JPG](#)

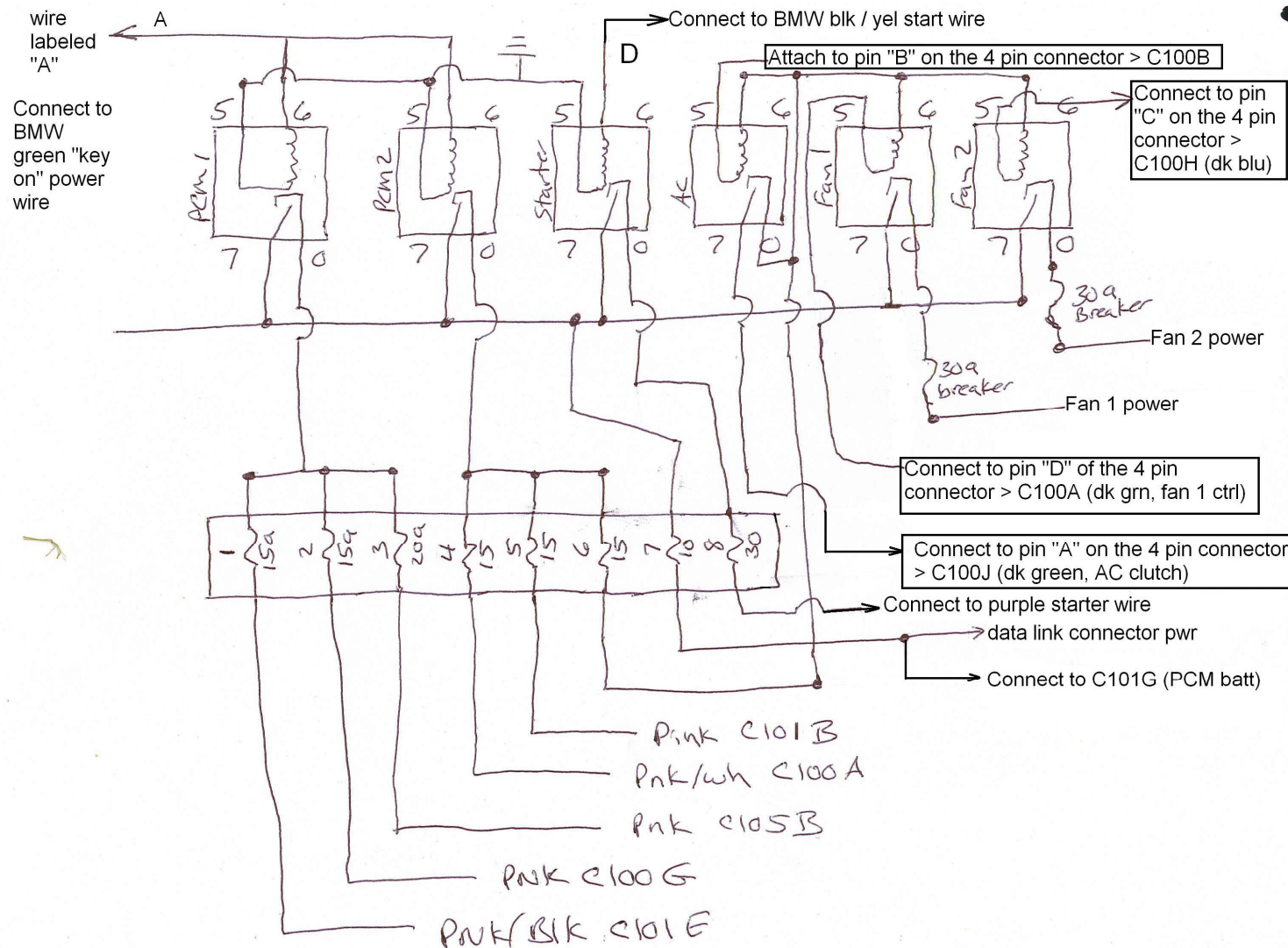
- 71 Connect the ground (black) wire to the ground terminal on the battery tray.  
72 Cut long black wire to length and connect to ground wire coming from the DLC.  
73 Connect DLC red jumper wire to the bullet connector coming from fuse #7  
74 Large power feed connects to the middle battery terminal. Do not connect until you are ready to start the motor.  
75 Run the long fan wires (F1 & F2) along the edge of the fender up to radiator area. Secure with tie straps.



[Electrical center front view.JPG](#)



For your reference, this is a schematic of the new electrical center (crude but accurate):



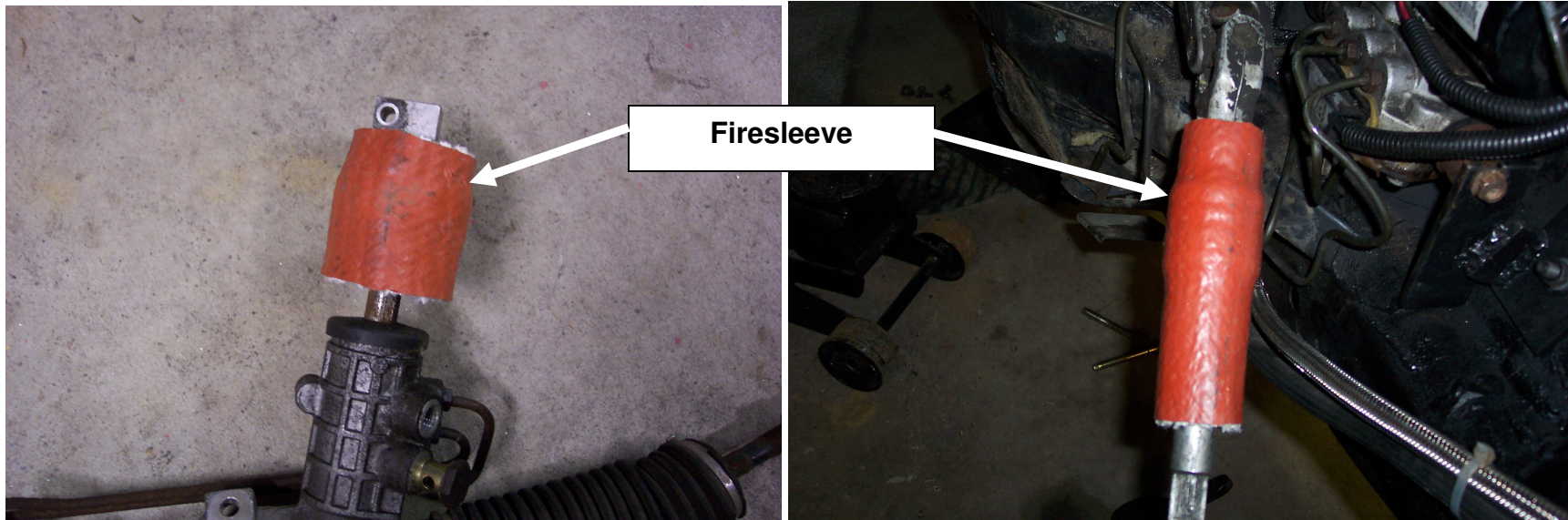


- 76 Install reworked braked pedal and bracket.
- 77 Attach clutch line to barb fitting on reservoir.
- 78 Attach steel clutch line to clutch master cylinder being sure it snaps into place past the retaining clip. Loosen ABS modulator and move out of the way if you need more clearance to get to this fitting.
- 79 Remove rubber hose from end of steel clutch line and screw the m10 to -4 flare clutch line adapter to the end of steel clutch line.
- 80 Install Hydroboost brake booster and master cylinder.
- 81 Attach booster push rod to the brake pedal.



[Brake pedal connected to booster.JPG](#)

- 82 .  
83 Bend brake lines and attach brake lines to master cylinder. Note: the inboard line goes to the rear MC port.  
84 Fill brake fluid reservoir and bleed brakes  
85 Test brakes for leaks by applying holding high force on the brake pedal for 10-15 seconds then inspect each fitting at the master cylinder and ABS modulator for any signs of leaking.  
86 Slide small diameter firesleeve onto steering shaft to protect rubber sleeve.  
88 Slide large diameter firesleeve onto steering rack flex coupler.



# THAT'S IT FOR CAR PREP!

### Revisions:

01Jan07 Modified brake line installation to just rebend and attach to master cylinder. Do not cut and flare.